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Indian Standard

SPECIFICATION FOR IGLOO

PART 2 STRUCTURAL IGLOO ASSEMBLY

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NEW DELHI 110002

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Indian Standard

SPECIFICATION FOR IGLOO

PART 2 STRUCTURAL IGLOO ASSEMBLY

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(*Continued on page* 2)

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(*Continued from page* 1)

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Indian Standard

SPECIFICATION FOR IGLOO

PART 2 STRUCTURAL IGLOO ASSEMBLY

0. FOREWORD

0.1 This Indian Standard (Part 2) was adopted by the Indian Standards Institution on 30 March 1984, after the draft finalized by the Air Cargo Handling Sectional Committee had been approved by Marine, Cargo Movement and Packaging Division Council.

0.2 Igloos are intended to protect the interior of aircraft from damages and to provide a framework container into which cargo can be loaded. A structural igloo has a permanent base provided with interlocking continuous extrusions for its attachment to the base pallet. The contents in the igloo have to be properly secured to prevent load shifting. High density items should be individually secured with tie downs, stowage or dunnage.

0.2.1 In Part 1 of this standard, requirements of non-structural igloo have been covered.

0.3 To facilitate international coordination on the subject, this standard is based on ISO/DIS 6895 'Aircraft — Structural igloo assembly', published by the International Organization for Standardization (ISO) which is further based on IATA, Structural igloo assembly specification 50/4, issued by International Air Transport Association (IATA).

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies dimensional, structural, environmental and test requirements for structural igloo assemblies.

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*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions as given in IS : 7073 (Part 1) 1973* along with the following shall apply.

2.1.1 *Operational Load* — The minimum statically applied load which the structural igloo assembly shall be designated to withstand.

2.1.2 *Ultimate Load* — The load under which the structural igloo assembly may exhibit permanent deformation but does not rupture to the extent of discharging cargo.

3. BASE PALLET

3.1 The base pallet sizes and design features shall be in accordance with IS : 7074-1973†.

3.2 The base shall be structurally attached as an integral part of the shell. It shall be removable with hand tools and shall be interchangeable.

4. IGLOO CONTOURS

4.1 The igloo contours shall be in accordance with Fig. 1 to Fig. 10 of Part 1 of this standard.

4.2 Fittings and Components

4.2.1 *Handles or Straps*

4.2.1.1 The shell shall be provided with at least two recessed handles or straps on each of the 3 solid sides to facilitate movement of the structural igloo over roller and ball conveyor systems.

4.2.1.2 Each handle or strap shall be able to withstand a 4·5 kN pull force in any direction.

4.2.1.3 Each handle shall provide an area equivalent to 150 mm wide and 75 mm deep for gripping with a gloved hand.

4.2.2 *Tie-Down Fittings* — Single stud or continuous seat track type tie-down fittings shall be mounted around the interior walls spaced 508 mm apart and at the following heights:

a) near the base (not required if equivalent tie-down provisions are available in the base), and

b) at one half of the shell height.

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*Glossary of terms relating to air cargo pallets and containers: Part 1 Air Cargo pallets.

†General requirements of air cargo pallets.

Each of these fittings shall be able to withstand a load of 9 kN in any direction.

4.2.3 *Components* — The component parts shall be interchangeable.

4.3 Vent Area — The shell shall be equipped with means for providing emergency pressure relief, equivalent to a panel size of 84 cm^2. The panel shall be protected from cargo load shifting to ensure that the required panel area is available during aircraft emergency operation. This panel or its equivalent shall be considered as a blowout panel to relieve internal pressure when in service.

NOTE — This may be provided by a section or sections that provide continuous unrestricted air flow from inside to outside. Clearances around the doors may contribute to, or substitute for, this relief area.

4.4 Doors — The doors may be designed to be rigid or flexible, for example net and tarpaulin.

4.4.1 *Doors-Loading Access* — The door shall be designed to make a maximum possible internal cross-section available for loading.

4.4.2 *Door Operation* — It shall be possible for one man to open or close the door in no more than one minute.

4.4.3 *Door Location* — The lower edge of the door shall not enroach on the area 28·5 mm from the outside edge of the base.

4.4.4 *Door Handles Straps or Hand Holds*

4.4.4.1 Handles, straps or hand holds shall be provided on each door for handling the door and to assist in manual movement of the structure igloo assembly. These devices shall be able to withstand a 4·5 kN pull force in any direction. They shall be provided an area equivalent to 150 mm wide by 75 mm deep for gripping with a gloved hand and shall be designed so as to cause no damageto adjacent units.

4.4.5 *Door Latches and Restraint Attachments*

4.4.5.1 The door shall have the minimum number of positive latches and restraint attachments that will sustain the ultimate loads prescribed in **6.2** without unlatching or releasing the structural igloo assembly contents.

4.4.5.2 Door latch and restraint hardware design shall preclude damage to igloo or door during door stowage and installation removal with no special attention.

4.4.5.3 Latches shall be located so that they cannot damage or be damaged by adjacent units should they inadvertently be left open or become open in flight.

4.4.5.4 No tools shall be required to open or close the doors or latches.

4.4.5.5 The door latching and installation mechanisms shall be designed to allow door installation and removal while the structural igloo assembly is sitting on uneven surfaces that may vary as much as 12·5 mm over the 3 175 mm or 2 743 mm lengths.

4.4.6 *Door Components* — Door assemblies and components shall be interchangeable.

4.4.7 *Door Locking* — It shall be possible to lock (discourage entry) and seal door as to give visual indications of unauthorized entry. Means shall be provided to give mechanical indication that the door is positively locked.

4.4.8 *Door Sealing* (*Water*) — Particular design attention should be given to prevention of water intrusion through door to igloo assembly interface areas.

5. COMPLETE ASSEMBLY

5.1 Base/Shell Attachment — The base shall be attached firmly to the shell along the 2 235 mm edges. The base shall be attached to the shell along the 3 175 mm or 2 743 mm edges opposite the door.

6. DESIGN LOADS

6.1 Operational Loads — The structural igloo assembly shall be designed for the operational loads as given in Table 1 of IS : 7074-1973*.

Under these loads the deflection at the intersection of each side and top end shall not exceed 38 mm from the vertical line of the base edge.

6.2 Ultimate Design Load — The structures igloo assembly shall be designed to ultimate load as specified in Table 1 of IS : 7074-1973*.

The structural igloo assembly shall be designed so that load distributed to the aircraft restraint system, are at every restraint point equal to or less than the load distributed by the pallet/net device. The centre of gravity shall be 91 cm above the pallet and offset 10 percent laterally and longitudinally from the centre of the pallet for the 2 235 mm × 2 743 mm/3 175 mm units.

7. MATERIALS AND PROCESSES

7.1 General Requirements for Materials and Processes — The materials and processes selected shall give consideration to the extremely hard usage to which the structural igloo assembly shall be subjected, to provide for maximum service life. All metal parts shall be suitably protected against corrosion. All non-metallic materials which are liquid absorbent shall be sealed or treated to prevent liquid absorbtion.

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*General requirements of air cargo pallets.

7.2 Serviceability — The igloo shall be designed and built using materials which will provide maximum serviceability and protection of contents under intended environment conditions.

7.3 Fastenings — All fasteners shall be of aircraft standards and the number of sizes, styles and strengths shall be kept to a minimum. No slotted head screws shall be used.

7.4 Tare Mass Objectives — The tare mass of the structural igloo assembly shall be a minimum consistent with the requirements and within limits of sound design practices. The tare-mass objective for the structural igloo assembly shall be 19 kg/m^3 based on external volume (*see* Table 1 of Part 1 of this standard).

8. ENVIRONMENT CRITERIA

8.1 Temperature — The structural and operational integrity of the structural igloo assembly shall be maintained in a temperature environment from —54 to +72°C.

8.2 Protection Against Deterioration — All components of the structural igloo assembly shall be protected against deterioration of lose of strength in service due to weathering, corrosion, abrasion or other causes where the type of material used requires such protection.

8.3 Handling Factors — The structural igloo assembly shall be designed so that it shall withstand handling common to air land freight terminal and ramp operations.

8.4 Flame Resistance — The structural igloo assembly materials utilized shall meet the fire resistance requirements of the appropriate airworthiness regulatory body.

9. DESIGN AND PERFORMANCE TESTS

9.1 Structure Igloo Assembly Performance

9.1.1 *Bridging/Cresting* — The fully loaded structure igloo assembly shall be capable of negotiating a floor to ramp angle of 10° in either bridging or cresting during terminal handling.

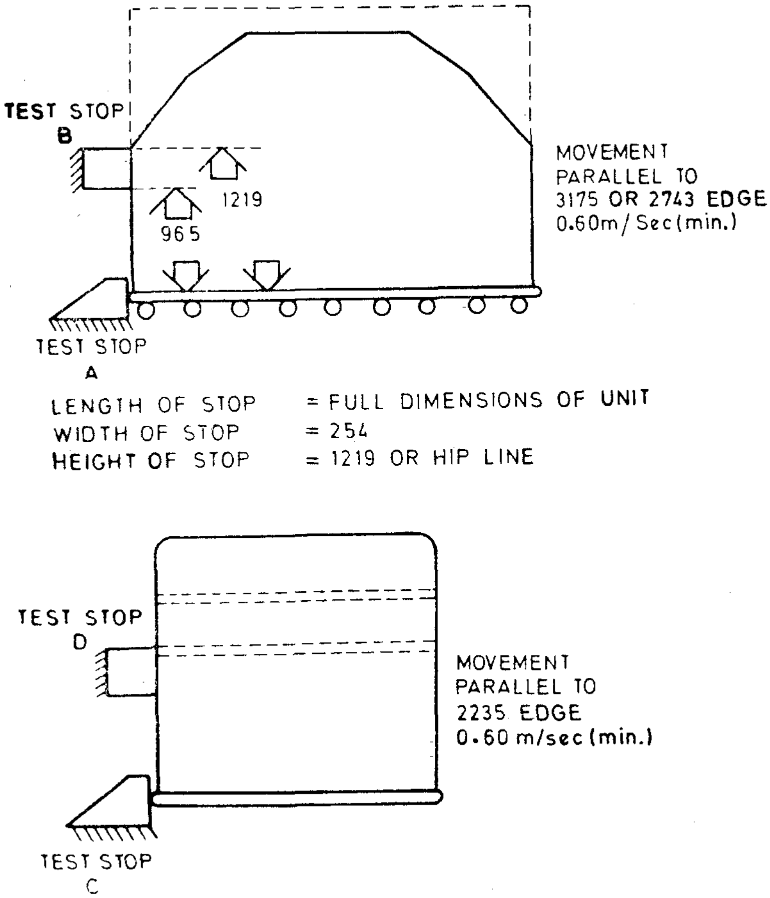
9.1.2 *Deformation Under Load* — The igloo loaded to ultimate design loads for not less than one minute may exhibit permanent deformation but, shall not rupture to the extent of discharging contents.

9.2 Impact Loads

9.2.1 *Impact Test Procedure* — The structural igloo assembly shall be uniformly loaded to its maximum gross mass and cycled 250 times at a minimum speed of 0·6 m/s on a roller bed to impact against solid stops. This shall be done for each of the following moving directions and conditions (*see* Fig. 1):

a) Move parallel to 3 175 or 2 743 mm edge and impact against base,

b) Move parallel to 3 175 or 2 743 mm edge and impact against shell,



All dimensions in millimetres.

FIG. 1 IMPACT TEST

c) Move parallel to 2235 mm edge and impact against base, and

d) Move parallel to 2235 mm edge and impact against shell.

9.2.2 *Test Result* — The maximum allowable permanent deformation after any one of the four series of 250 impact sets is 9·6 mm.

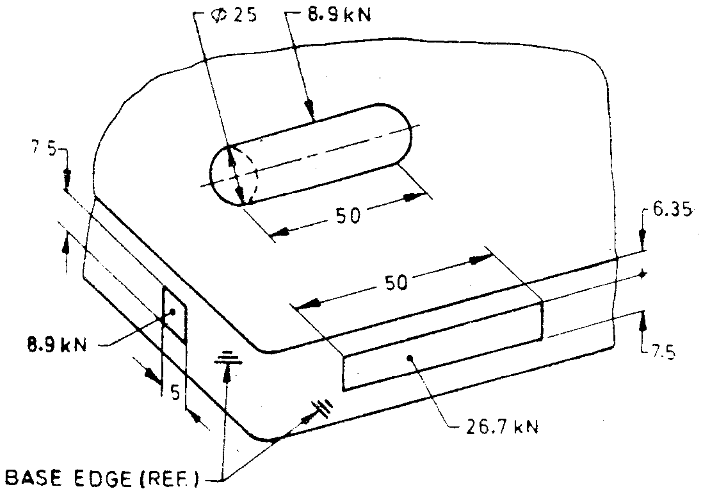
9.3 Local Indentation of the Base Panel

9.3.1 *Test Procedure* — The test for the following conditions is in accordance with Fig. 2:

a) Apply a 8·9 kN load by a steel roller, 50 mm long by 25 mm diameter.

b) Apply a 26·7 kN load parallel to the base over an area of 50 mm long by 7·5 mm wide.

c) Apply a 8·9 kN load parallel to the base over an area of 5 mm long by 7·5 mm wide.



All dimensions in millimetres.

FIG. 2 LOCAL INDENTATION LOADING TEST

9.3.2 *Test Result* — The maximum indentation (permanent set) allowed at any location of the lower surface of the base shall be 0·25 mm.

9.4 Ball Load Capability

9.4.1 *Test Procedure* — The structural igloo assembly base surface or a representative portion thereof shall be subjected to a force of 4 kN on a 25 mm diameter steel ball.

9.4.2 *Test Results* — There shall not be permanent indentation in excess of 0·5 mm.

9.5 Ball Caster Load Capability

9.5.1 *Test Procedure* — The base or a representative portion thereof shall be subjected to a uniformly distributed load generated by a mass of 0·95 kN supported by four 25 mm diameter steel ball castors on a 127 mm rigid pattern. The base shall be moved over the castors for a minimum of 5 000 passes along a fixed line in each of two directions, 90 degrees to, and intersection each other. The length of the stroke shall be approximately 300 mm.

9.5.2 *Test Results* — At the conclusion of the test, there shall be no evidence of deterioration of the base/ball castor interface surface.

9.6 Rain Resistance Water Test — Water will be directed over the structural igloo assembly and around the door to simulate a heavy driving rain equivalent to what would be experienced by structural igloo assembly secured to an open truck and being transported at 80 km/h.

10. MARKING

10.1 The following markings shall be shown on the top left hand on all four corners of the structural igloo assembly in such a manner that good readability is ensured under all phases of handling. Lettering shall not be less than 25 mm high:

Maximum gross mass..............................kg
Tare mass...kg
Volume..m^3

10.1.1 In addition, manufacturer's markings shall be indicated as follows: The positioning is optional and lettering shall be approximately 6 mm:

Manufacturer ....
(Name and country)
Part Number......................................
Certification.....................................